

# EMERGENCY AIRWORTHINESS DIRECTIVE



Aircraft Certification Service  
Washington, DC

U.S. Department  
of Transportation  
**Federal Aviation  
Administration**

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**ISSUE DATE: August 29, 2005**

**AD: 2005-18-51; FAA-2005-22252; Directorate Identifier 2005-NM-182-AD**

Emergency airworthiness directive (AD) 2005-18-51 is sent to all owners and operators of Boeing Model 777 airplanes.

## **Background**

On April 29, 2005, the FAA issued AD 2005-10-03, amendment 39-14080 (70 FR 24703, May 11, 2005), for certain Boeing Model 777-200 and -300 series airplanes. That AD requires modification of the operational program software (OPS) of the air data inertial reference unit (ADIRU) from software version part number (P/N) 3470-HNC-100-03 to software version P/N 3475-HNC-100-06 or 3474-HNC-100-07. That AD resulted from a report of the display of erroneous heading information to the pilot due to a defect in the OPS of the ADIRU. We issued that AD to prevent the display of erroneous heading information to the pilot, which could result in loss of the main sources of attitude data, consequent high pilot workload, and subsequent deviation from the intended flight path.

## **Actions Since Issuance of Previous AD**

Since that AD was issued, we received a recent report of a significant nose-up pitch event on a Boeing Model 777-200 series airplane while climbing through 36,000 feet altitude. The flight crew disconnected the autopilot and stabilized the airplane, during which time the airplane climbed above 41,000 feet, decelerated to a minimum speed of 158 knots, and activated the stick shaker. A review of the flight data recorder shows there were abrupt and persistent errors in the outputs of the ADIRU. These errors were caused by the OPS using data from faulted (failed) sensors. This problem exists in all software versions after P/N 3470-HNC-100-03, beginning with P/N 3477-HNC-100-04 approved in 1998 and including the versions mandated by AD 2005-10-03. While these versions have been installed on many airplanes before we issued AD 2005-10-03, they had not caused an incident until recently, and the problem was therefore unknown until then. OPS using data from faulted sensors, if not corrected, could result in anomalies of the fly-by-wire primary flight control, autopilot, auto-throttle, pilot display, and auto-brake systems, which could result in high pilot workload, deviation from the intended flight path, and possible loss of control of the airplane.

## **Explanation of Relevant Service Information**

We have reviewed Boeing Alert Service Bulletin 777-34A0137, dated August 26, 2005. The service bulletin describes procedures for installing OPS, P/N 3470-HNC-100-03, in the ADIRU.

We also have reviewed Boeing 777 Operations Manual Bulletin (OMB) CS3-3093, dated August 26, 2005, which describes operating instructions to inform the flight crew of possible heading errors following on-ground automatic realignment of the ADIRU with the OPS, P/N 3470-HNC-100-03, installed.

In addition, we have reviewed Boeing 777 OMB CS3-3155, dated August 26, 2005, which describes operating instructions to inform the flight crew of potential drift angle discrepancies on the primary flight display and the navigation display with the OPS, P/N 3470-HNC-100-03, installed.

### **FAA's Determination and Requirements of the Rule**

We have evaluated all pertinent information and identified an unsafe condition that is likely to exist or develop on other Boeing Model 777 airplanes of this same type design. Therefore, we are issuing this AD to prevent the OPS from using data from faulted (failed) sensors, which could result in anomalies of the fly-by-wire primary flight control, autopilot, auto-throttle, pilot display, and auto-brake systems. These anomalies could result in high pilot workload, deviation from the intended flight path, and possible loss of control of the airplane. This new AD supersedes AD 2005-10-03. This new AD requires accomplishing the actions specified in Boeing Alert Service Bulletin 777-34A0137, described previously. Because these actions reintroduce the unsafe condition identified in AD 2005-10-03, this new AD also requires revising the Limitation section of the Airplane Flight Manual by inserting a copy of Boeing 777 OMBs CS3-3093 and CS3-3155, described previously.

### **Interim Action**

We consider this proposed AD interim action. The manufacturer is currently developing a modification that will address the unsafe condition identified in this AD and AD 2005-10-03. Once this modification is developed, approved, and available, we may consider additional rulemaking

### **Examining the Docket**

You may examine the contents of this AD docket on the Internet at <http://dms.dot.gov> (on the next business day after we have issued the AD), or in person at the Docket Management Facility, U.S. Department of Transportation, 400 Seventh Street SW., room PL-401, on the plaza level of the Nassif Building, Washington, DC. This docket number is FAA-2005-22252; the directorate identifier for this docket is 2005-NM-182-AD.

### **Authority for this Rulemaking**

Title 49 of the United States Code specifies the FAA's authority to issue rules on aviation safety. Subtitle I, Section 106, describes the authority of the FAA Administrator. Subtitle VII, Aviation Programs, describes in more detail the scope of the Agency's authority.

We are issuing this rulemaking under the authority described in Subtitle VII, Part A, Subpart III, Section 44701, "General requirements." Under that section, Congress charges the FAA with promoting safe flight of civil aircraft in air commerce by prescribing regulations for practices, methods, and procedures the Administrator finds necessary for safety in air commerce. This regulation is within the scope of that authority because it addresses an unsafe condition that is likely to exist or develop on products identified in this rulemaking action.

## **Determination of Rule's Effective Date**

This AD is issued under 49 U.S.C. Section 44701 according to the authority delegated to me by the Administrator, and is effective immediately upon receipt.

**2005-18-51 BOEING: Docket No. FAA-2005-22252; Directorate Identifier 2005-NM-182-AD.**

## **Effective Date**

(a) Emergency AD 2005-18-51, issued on August 29, 2005, is effective immediately upon receipt.

## **Affected ADs**

(b) This AD supersedes AD 2005-10-03.

## **Applicability**

(c) This AD applies to all Boeing Model 777-200, -300, and -300ER series airplanes, certificated in any category.

## **Unsafe Condition**

(d) This AD results from a recent report of a significant nose-up pitch event. We are issuing this AD to prevent the operational program software (OPS) from using data from faulted (failed) sensors, which could result in anomalies of the fly-by-wire primary flight control, autopilot, auto-throttle, pilot display, and auto-brake systems. These anomalies could result in high pilot workload, deviation from the intended flight path, and possible loss of control of the airplane.

## **Compliance**

(e) You are responsible for having the actions required by this AD performed within the compliance times specified, unless the actions have already been done.

## **Installation of OPS**

(f) Within 72 hours after receipt of this AD, do the actions specified in paragraphs (f)(1) and (f)(2) of this AD.

(1) Install OPS, part number (P/N) 3470-HNC-100-03, in the air data inertial reference unit (ADIRU), in accordance with the Accomplishment Instructions of Boeing Alert Service Bulletin 777-34A0137, dated August 26, 2005.

(2) Revise the Limitations section of the Airplane Flight Manual (AFM) by inserting a copy of the Boeing operations manual bulletins in Table 1 of this AD.

**Table 1 – Operations Manual Bulletins**

<b>Boeing 777 Operations Manual Bulletin</b>	<b>Date</b>
(i) CS3-3093	August 26, 2005
(ii) CS3-3155	August 26, 2005

(g) When the information in the operations manual bulletins in Table 1 of this AD has been incorporated into the general revisions of the AFM, the general revisions may be incorporated into the AFM, and these operations manual bulletins may be removed from the AFM.

### **Parts Installation**

(h) As of the effective date of this AD, only OPS, P/N 3470-HNC-100-03, may be loaded into the ADIRU.

### **Alternative Methods of Compliance (AMOCs)**

(i) The Manager, Seattle Aircraft Certification Office, FAA, has the authority to approve AMOCs for this AD, if requested in accordance with the procedures found in 14 CFR 39.19.

### **Related Information**

(j) None.

### **Contact Information**

(k) For technical information about this AD, contact: Paul Feider, Aerospace Engineer, Systems and Equipment Branch, ANM-130S, FAA, Seattle Aircraft Certification Office, 1601 Lind Avenue, SW., Renton, Washington 98055-4056; telephone (425) 917-6467; fax (425) 917-6590. For service information identified in this AD, contact Boeing Commercial Airplanes, P.O. Box 3707, Seattle, Washington 98124-2207.

Issued in Renton, Washington, on August 29, 2005.

*Original Signed By:*

Ali Bahrami,  
Manager,  
Transport Airplane Directorate,  
Aircraft Certification Service.